

**Preliminary Structural Project Report
For
Bridge Deck Replacement Project
I-80, Over Rails to Trails & Silver Creek Canyon
For
Structure: 4C-325, I-80WB over Rails to Trails**



Project Manager: Lisa Wilson
Project Number: BHF-80-4(108)152
PIN number: 5310
CID number: 5222701D

FY: 2007

Structural Designer: HDR, Carmen Swanwick

UDOT

Structures Division

Region 2

Prepared by

Daniel Page/Supplemented by Parsons Brinckerhoff

November 2005

Updated by Daniel Page/Chris Potter

October 2006

Reviewed By Structures Group: 10/24/2006

REPORT SUMMARY

Scope of Project:

1. Purpose of Report

This report presents a conceptual overview of a project to replace the bridge deck and/or replace the existing structure with buried structures (4C-325). This bridge is located in Region 2 on I-80 over Rails to Trails & Silver Creek Canyon. This report is intended to convey the need, scope, schedule, budget, safety, and quality control process for the project.

2. Project Information

Region: 2 **Route No.:** I-80 **Date:** October 2006
Project Name: Bridge Deck Replacement, 4C-325; On I-80, Over Rails to Trails & Silver Creek Canyon
R.P.: 152.359- 152.421 (according to the new UDOT Blue Book)
Project Number: BHF-80-X()153 **PIN:** 5310 **CID:** 5222701D
Project Design: Bridge: UDOT Structures Division; Region 2 Pre-Construction
Project Mgr: Lisa Wilson #(801) 887-3465

3. Plan:

There are no future plans to widen I-80 through the canyon at this time.

Parsons Brinckerhoff conducted a preliminary Feasibility Study. The Feasibility Study evaluated the following options based on constructability, life cycle costs (cost to benefit), design life, maintenance, and impact to the traveling public. Listed below were the options for consideration on Bridge 4C-325:

1) Bridge Replacement:

- i. Two Span Bridge
- ii. Three Sided Box
- iii. Precast Arch

2) Major Bridge Rehabilitation:

- i. Deck Replacement
- ii. Seismic Retrofit

During the Feasibility Study, Parsons Brinckerhoff utilized input from Region 2, Union Pacific Railroad, Local Stakeholders, and the UDOT Structures Team to come to a mutual decision in regards to what work should take place on the structure. Parsons Brinckerhoff implemented the use of a Performance Measure Matrix to weigh the pros and cons of each option and with the help of the Feasibility Study Team opted for the Rehab Option in which the bridge would receive a complete deck replacement with a seismic retrofit.

4. Work items to be completed:

According to the latest bridge inspection, which was completed in May of 2005, this bridge requires extensive work including the following:

- Remove Existing 7" Asphalt Overlay
- Remove and Replace Concrete Deck & Approach Slabs w/Sleeper Slabs
- Adjust Moveable Bearings at B1, B2 & B3
- Straighten Bearing Unit/Stiffener at Span 4 – NW End 2 Outside Girders @ B3
- Spot Clean & Overcoat Structural Steel
- Roadway Transitions (150' each end)
- Roadway Drainage for Bridge at NW Corner

5. Work items to be deferred:

Roadway and safety items beyond what is related to the bridge repairs will not be included; this includes approach guardrail, and barrier standards.

6. Design Exceptions:

There is expected to be bridge design exceptions required on the horizontal and vertical geometry, shoulder widths, and attenuation.

7. Maintenance Considerations:

Region 2 Maintenance Station 2436 should be included in the concept development.

8. Construction Considerations:

CMGC along with Accelerated Bridge Construction (ABC) shall be utilized on this project where the following options shall be considered for the existing bridge:

- 1) Removing only the deck and replace with pre-cast deck panels.**
 - i. Deck Replacement w/Seismic and with out.
 - ii. Utilizing Crossovers
 - iii. Utilizing a Temporary Bridge
- 2) Replace the existing structure with two new box culverts. One Box Culvert will span Rails to Trails, and the other to span Silver Creek.**
 - i. Utilizing Crossovers
 - ii. Utilizing a Temporary Bridge
- 3) Impacts to I-80 must be minimal during the entire project and construction activities requiring traffic crossovers shall be completed within a 2-week window.**

- 4) **The Temporary Bridge Option will require additional earthwork and shoring on the North side of the existing structure to provide the necessary space required for traffic (see picture below).**



The following items must be addressed in the Limitation of Operations and/or in other appropriate project specifications:

1. User access to the recreation trail beneath the bridge must be maintained at all times. Consider placing pre-cast box culverts in the construction zone to protect users from falling debris.
2. The construction window requiring the use of traffic crossovers must be limited to 2-weeks. No holidays can fall within this time period and it shall not begin nor end within 24 hours of a holiday or holiday weekend. The same considerations apply for any special events such as the Hot Air Balloon Festival in Park City.
3. Traffic control methods will be critical to the success of this project and will be a considerable percentage of the overall construction cost. Consider using moveable barrier for quick setup and removal when crossing over traffic. At least one lane of traffic in each direction must be maintained during the 2-week construction window and all lanes of traffic must be maintained at any other time.
4. Environmental regulations must be met when demolishing and replacing the bridge deck portions spanning Echo Creek.
5. Response time for any kind of accident must be minimized. Consider requiring Utah Highway Patrol and Tow Truck presence 24-hours a day during the 2-week construction window.
6. The bridge deck demolition and replacement are time critical and as a result an incentive/disincentive program, such as A+B, shall be included in the contract documents.
7. Utilize the existing crossover at the South end of the Wanship Interchange.

9. **Risk Analysis:** (None anticipated at this time)

10. **Development Process:**

New or Major Reconstruction x

Rehabilitation
Preservation

 x

Schedule of Project:

To get the best quality and bid prices, it is expected that this project be advertised no later than **February 28, 2007**. Design should take no longer than one month. Construction should be completed in summer season. A tentative schedule is:

- | | | | |
|----|-----------------------|---------------------|------|
| 1. | Begin Design Phase | Fall/Winter | 2006 |
| 2. | Advertisement Date | February 28th | 2007 |
| 3. | Begin Construction | May 1 st | 2007 |
| 4. | Complete Construction | August 31st | 2007 |

Budget of Project:

1. **Funding Source:** **Highway Bridge Program Fund**
2. **Amount Programmed:** **\$3.5 Million**
3. **Cost Estimates:** **\$ 3.55 Million**

| Summary of Costs | |
|---|------------------------|
| <u>Option 1a</u> : Rapid Bridge Deck Replacement with Crossovers | \$3.8 Million |
| <u>Option 1b</u> : Rapid Bridge Deck Replacement with ACROW Temporary bridge (limited Traffic Control). | \$3.55 Million |
| <u>Option 2a</u> : Bridge Replacement with Buried Structure(s) | \$3.45 Million |
| <u>Option 2b</u> : Bridge Replacement with Buried Structure(s) & placement of a temporary ACROW Bridge (limited Traffic Control) | \$ 4.59 Million |

Option 1b, was selected by the Project Team

Option 1b - Rapid Bridge Deck Replacement w/Temporary Bridge

4C-325, I-80 over Silver Creek & Rails to Trails

| STRUCTURE ITEMS | | | |
|---|----------|------|-----------------------|
| Item | Quantity | Unit | |
| ACROW Temporary Bridge (13.7ft X 296ft) | 1 | EACH | |
| Temporary Abutments for Acrow Bridge | 2 | EA | |
| 2" HMA Overlay on the Acrow Bridge | 50 | TONS | |
| Road Work for Tie-Ins on Temporary Bridge | 1 | LUMP | |
| Temporary Bridge Subtotal | | | |
| | | | |
| Remove & Replace Bridge Deck (296ft x 35ft) | 10370 | SF | |
| Remove & Replace Approach/Sleeper Slabs and Place a 3" Joint At Both Ends | 64 | CY | |
| Adjust Moveable Bearings @ B1, B2 & B3 (if needed) | 15 | EACH | |
| Straighten Bent Bearing Units/Stiffeners @ Span 4 - NW End 2 Outside Girders @ B3 (if needed) | 2 | EACH | |
| Spot Clean and Overcoat Structural Steel (Est. 20% of total area) | 4200 | SF | |
| Roadway Transitions (150' each end) | 1 | LUMP | |
| Roadway Drainage for Bridge at NW Corner | 1 | EACH | |
| Incentives A+B | 1 | LUMP | |
| Innovative Contracting | 1 | LUMP | |
| Bridge Subtotal | | | |
| | | | |
| Pavement Marking Paint | 1 | LUMP | |
| Public Information Services | 1 | LUMP | |
| MOT | 1 | LUMP | |
| Mobilization | 1 | LUMP | |
| Traffic Control | 1 | LUMP | |
| Project Subtotal | | | |
| | | | |
| PE/CE 20% | | | |
| 15% Contingency | | | |
| | | | |
| TOTAL PROJECT COSTS | | | \$3,549,738.94 |

Location Map

